

40AR/39AR DATING OF WEATHERING PROFILES AND LANDSCAPE EVOLUTION IN THE AUSTRALIA AND BRAZIL

VASCONCELOS, P.M., FENG, Y., KEAY, S. University of Queensland, Department of Earth Sciences, Brisbane, Queensland, Australia

The distribution and preservation of weathering profiles provides information about past climatic and geochemical conditions and landscape evolution processes. $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of supergene minerals yields precise and accurate ages of weathering useful in the study of paleoclimatology, global geochemistry, and geomorphology. Comprehensive studies on the geochronology of weathering processes in the Carajás Region, Pará, Brazil, the Mount Isa Region, Queensland, Australia, and the Hamersley Region, Western Australia provide an extensive database on the weathering history of southern hemisphere stable cratons. The results show that weathering profiles in these regions have been continuously exposed to surficial conditions since the end of the Mesozoic and that the genesis of these weathering profiles was episodic through time. The episodicity in the formation of weathering profiles indicates that the profiles record climatic conditions favoring rapid propagation of the weathering fronts. In these regions, we observe a strong correlation between ages and elevation of weathering profiles. Comprehensive weathering geochronology studies on more tectonically active regions of eastern Queensland, however, indicate that weathering profiles in the Charters Towers and Mary Valley regions are Miocene or younger, reflecting the active erosional processes associated with these more tectonically active regions. In addition, Eastern Queensland study sites lack a correlation between age and elevation, possibly indicating the effects of neotectonic processes in these areas.